

## Chapter VIII

# Hyperbook Features Supporting Active Reading Skills

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### Abstract

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*MetaLinks is a domain independent authoring tool and web server for adaptive textbooks ("hyperbooks") that supports active reading. We show how cognitive and educational research and theory from the areas of text comprehension and active reading strategies can be applied to hyperbooks. Adaptivity and other MetaLinks features allow us to create a single hyperbook that serves multiple purposes. A MetaLinks hyperbook can serve as textbook and reference book; can be equally appropriate for novice and advanced readers, and can be coherently read from a number of thematic perspectives. "Active reading/learning" refers to a set of high level reading, searching, problem solving, and metacognitive skills. We describe the MetaLinks system and how its features support a number of behavioral, cognitive, and metacognitive active reading skills.*

### Introduction

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In this chapter, we show how cognitive and educational research and theory from the areas of text comprehension and active reading strategies can be applied to the domain of hypermedia textbooks ("hyperbooks"). We describe our work on the MetaLinks

system, an authoring tool and Web-based server for adaptive hyperbooks. We illustrate how adaptive hyperbooks support active reading skills in ways that traditional texts do not (the focus of the work is on textbooks rather than narrative texts). MetaLinks is an adaptive hypermedia system, and thus composes pages “on the fly” so that the content, style, and/or sequencing of the page are customized to the needs of the particular learner and situation (Brusilovsky, 1998; DeBra & Calvi, 1998; Specht & Oppermann, 1998). Though non-adaptive (static) hypermedia has been popular for over 20 years, it is only recently that Internet data-base technologies that enable dynamic configuration and personalization of Web pages have become common. Adaptivity and other MetaLinks features allow us to create a single hyperbook that serves multiple purposes. A MetaLinks hyperbook can serve as textbook and reference book, can be equally appropriate for novice and advanced readers, and can be coherently read from a number of thematic perspectives.

“Active reading” refers to a set of high-level reading, searching, problem-solving, and metacognitive skills used as readers proactively construct new knowledge. We will sometimes refer to this general process as “active reading/*learning*” to reflect the fact that active readers of textbooks are proactively trying to construct knowledge. Because learners have different background knowledge, learning styles, and goals, and because each learner constructs new knowledge in a personal, idiosyncratic fashion, the best path through a textual resource may differ for each learner. “Active reading” is a term used to emphasize the dynamic, opportunistic processes observed in non-recreational reading of expository texts as done by experts and motivated readers. For example, Marshall and Shipman (1997) discuss dealing with information quantity overload as “information triage,” where readers quickly skim or otherwise assess the value and nature of informational components (texts, links, pages, etc.), then sort or categorize them for further use.

Though active reading skills are important because they lead to more efficient and effective comprehension and information finding, these skills are not very advanced in many students (and adults), and it is important to support, scaffold, and teach these skills. We acknowledge that in moving from paper to computer screen many affordances are lost (see Masten, Stallybrass, & Vickers, 1997; Schilit, Price, Golovshinski, Tanaks, & Marshall, 1999), and we do not advocate for the replacement of paper texts with electronic ones, but we are of the opinion that: a) the movement of textual material to electronic form is momentous and inevitable and thus we must engage in efforts to maximize the effectiveness and usability of electronic text, and b) electronic texts have the potential to support active reading in new and significant ways. Johnson and Afflerback (1985) see reading comprehension skills as being “eminently teachable” (also see Levinstein et al., 2003). Existing educational and informational hypermedia does not sufficiently make use of the affordances of the available technology to support and enhance key cognitive processes.

In this chapter, we first give some background in active reading, discussing the importance of considering differences in background knowledge, the importance of supporting local and global coherence, and culminating with a compiled list of 18 active reading skills culled from the literature. We then describe the MetaLinks system and MetaLinks hyperbooks. We illustrate several features unique to MetaLinks, including

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